



# STEM HELP WANTED

Idaho National Laboratory has a career for you!





**“What intrigues you? Is there a hobby, subject or event that motivates you to learn more? What are you passionate about? The purpose of this brochure is to show you that dreams matter and to emphasize that every journey begins with a first step.”**



## Now is the time to start planning for your future STEM career

On May 18, 1980, the most destructive volcanic eruption in American history took place at Mount St. Helens in Washington state.

More than two dozen bridges, 15 miles of railroad tracks and 185 miles of highway were destroyed.

So powerful was the blast that it reduced the mountain's summit from 9,671 feet to 8,363 feet.

A thick layer of ash blanketed the air for thousands of miles, leaving the sky dark in the middle of the day as far away as Spokane, Washington.

I was awestruck by this event as it played out on my television set. I wanted to know more.

I took classes that taught me about the natural world. Eventually, I went to college and majored in geology. Looking back, I can say that Mount St. Helens is the reason I became a geologist and, eventually, director of the nation's lead nuclear research and development laboratory.

What intrigues you? Is there a hobby, subject or event that motivates you to learn more? What are you passionate about? The purpose of this brochure is to show you that dreams matter and to emphasize that every journey begins with a first step.

You will read about some of Idaho National Laboratory's best and brightest, folks who, like me, have the honor of working every day to develop the clean energy needed to power the future and safeguard national security.

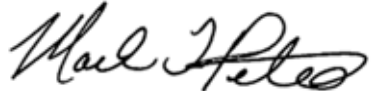
You will learn what motivated them to study nuclear engineering or chemistry or computer science and how these interests served as the launching pads for their careers. I hope the stories told here compel you to think about those things you care deeply about.

Once you determine your goals, achieving them won't be easy, but nothing worth doing ever is. Take school seriously. Don't shy away from science, technology, engineering and mathematics (STEM) classes. Understand what it will take to make your dreams come true.

Then, go for it! The world is a blank canvas waiting for you to leave your mark and nothing is more powerful than one person in passionate pursuit of a dream.

Not even a volcanic eruption that scorched 230 square miles of old growth forest, spread 540 million tons of ash over 22,000 square miles and released 24 megatons of energy.

Mark Peters.



Director, Idaho National Laboratory





# Chemist

Chemistry is the scientific study of matter, its properties and interactions with other matter and with energy. It is a science applicable to a wide range of career goals, including medicine, law, physical and social sciences, engineering, and public health and policy.

This career would be a good fit for you if you:



Have an inquisitive mind



Enjoy math and science



Are interested in the physical sciences



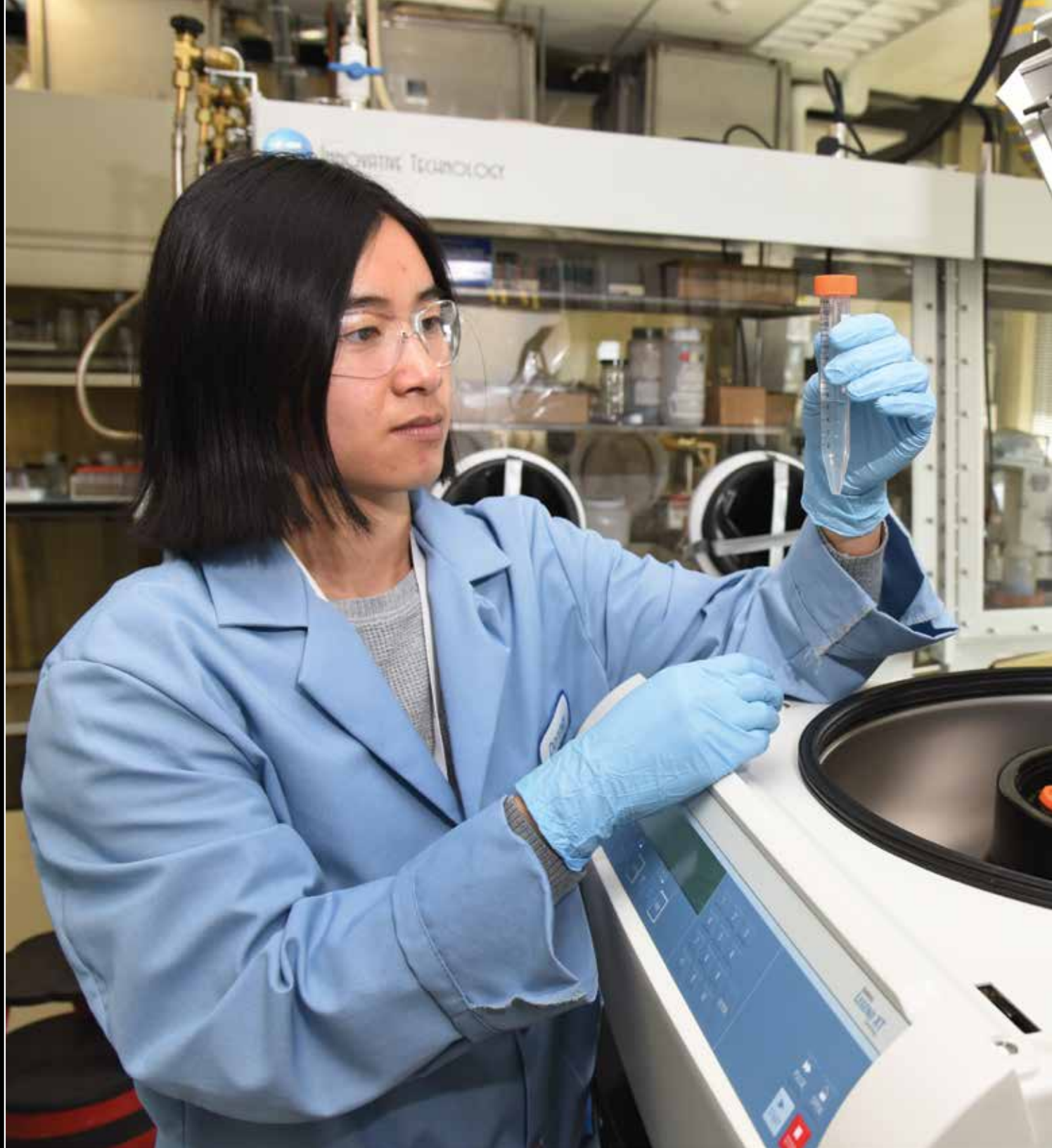
Are curious about how things work



Are a good problem solver



Want to do research in a laboratory



## Meet Donna Baek, a chemist at INL

### Education background:

Ph.D. in chemistry from University of Idaho

### Job description:

I use supercritical carbon dioxide, a sustainable solvent, to extract and separate targeted metals from various materials such as used nuclear fuel and end-of-life electronics. This work involves the study of metal-ligand complexes and using high-pressure systems.

### What led you to become a chemist?

I always knew I was going to be a scientist or engineer. As a child, I was interested in how things worked. When I was in high school, I excelled in math and science. I took the basic requirements such as biology and precalculus, but I went a step further and enrolled in special topic science classes like astronomy and genetics. It wasn't until I was exposed to chemistry lab in college that I decided to pursue chemistry. That is

where I applied what I learned from the classroom and put the pieces together. My general chemistry teacher inspired me to reach for the stars.

### What do you love about your job?

The best part of my job is being able to learn something new every day. There's never one way to solve a problem. Bouncing ideas around and learning to look at a problem with a different perspective is necessary to develop innovative solutions. Being able to collaborate with the brightest minds in science and engineering makes problem-solving much more interesting.

### Why is your work important to INL's mission and the world?

Part of INL's mission is to discover innovative clean-energy solutions. Supercritical carbon dioxide is an environmentally friendly solvent used in extraction processes such as recycling. It minimizes waste

production and is inexpensive and effective for recovering metals from liquid or porous solids. INL's team of experts in supercritical fluid extraction is helping us develop groundbreaking technologies to recover critical elements that are used in numerous clean-energy technologies.

### What advice do you have for future chemists?

Never give up. For every problem, there are hundreds of ways to approach and solve it. Some are obvious and others take a lot of trial and error to fully develop an answer. Challenge yourself and others to develop explanations and reasoning to a problem. Searching for a solution can be engrossing—don't forget to get plenty of exercise, fresh air, nutrients and sleep to maintain balance. Learning is supposed to be fun!

# \$62,000

AVERAGE STARTING  
SALARY



**"The best part of my job is being able to learn something new every day."**



## Computer Science

From developing cybersecurity software programs, to building complex wireless mobile devices, to creating social networking or gaming platforms, the work of computer scientists is very diverse. Computer scientists design, develop and test computing systems for a wide variety of purposes and are proficient in various operating systems, programming languages and techniques, and computer infrastructure.

This career would be a good fit for you if you:



Have strong skills in math and science



Enjoy working with computers and other technology



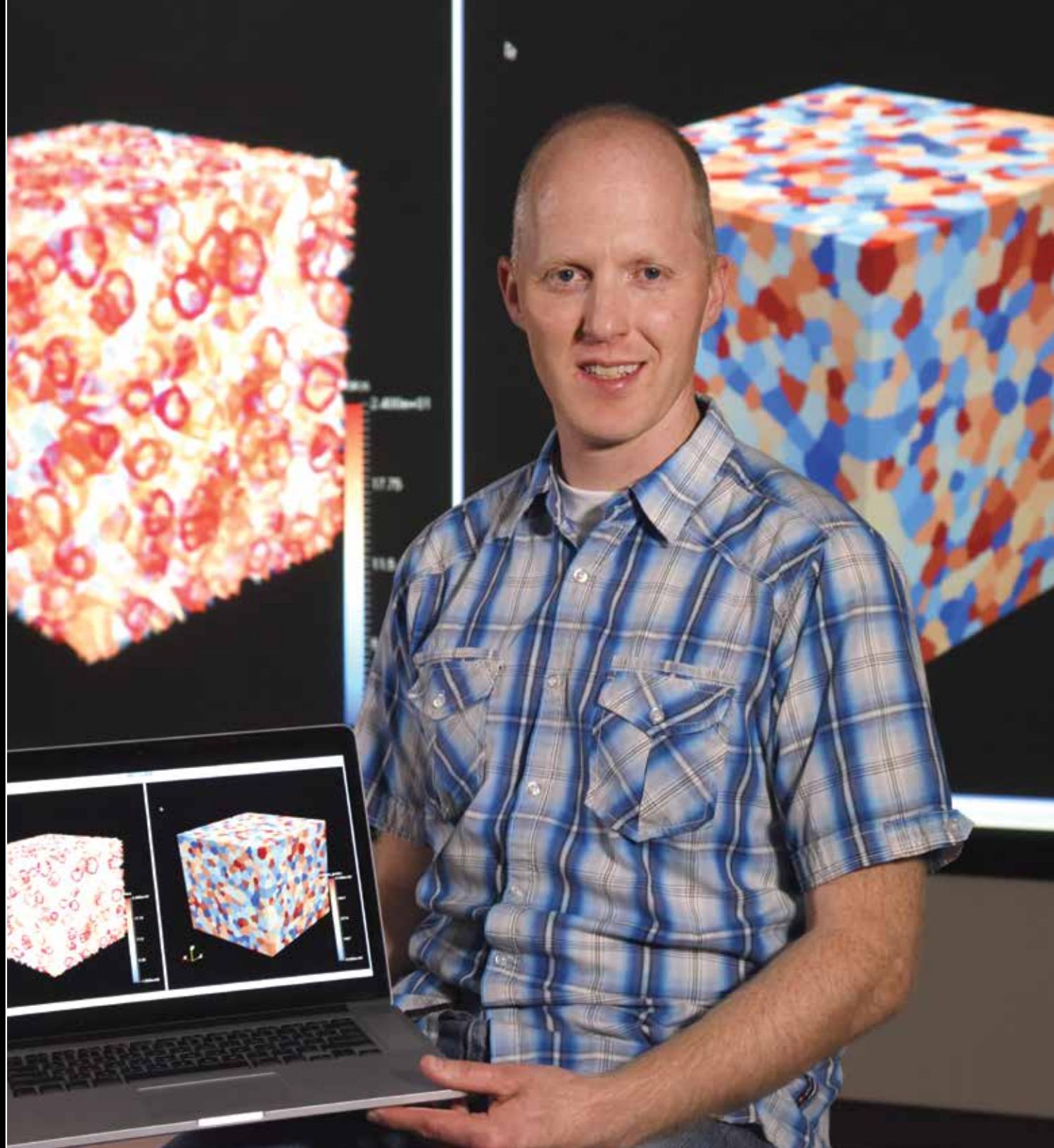
Are a creative, innovative problem solver



Are generally interested in how things work



Like the challenge of learning new things



## Meet Cody Permann, a modeling and simulation computer scientist at INL

### Education background:

Master's degree in computer science from University of Idaho, currently expecting to graduate with a Ph.D. in computer science from the University of Idaho in May 2017

### Job description:

I'm currently the lead of the computational frameworks team. We build, maintain and support the software framework used for a wide variety of complex multiphysics simulations both internally at INL and externally by scientists and engineers from all around the world.

### What led you to become a computer scientist?

I've always enjoyed tinkering with computers and electronics. My friends and I used to assemble computers from nothing but a case and a pile of components. I was always fascinated at the complexity of all the pieces and wanted to learn how they all worked. My best friend's dad was an electrical engineer and had a full electronics bench at his house. I remember spending a lot of time playing with electrical components and building simple circuits on breadboards. We also played plenty of video games and

learned how to write really simple programs in BASIC at the time.

I signed up for a few electronics courses where I learned basic electrical engineering principles and also received hands-on experience assembling and disassembling computers. There weren't any programming courses available in my high school, but I knew I wanted to learn how to program.

I didn't know if I should go into engineering, computer information systems or computer science until I started looking at the titles and descriptions of the courses for each major in the university course catalog. The required combination of classes with math, logic and programming in computer science really appealed to me, and the decision was easy to make.

### What do you love about your job?

I enjoy the constant challenge of working with so many different people in so many diverse fields. It's also fun working on a product that runs on the large cluster computer that the laboratory owns.

### Why is your work important to INL's mission and the world?

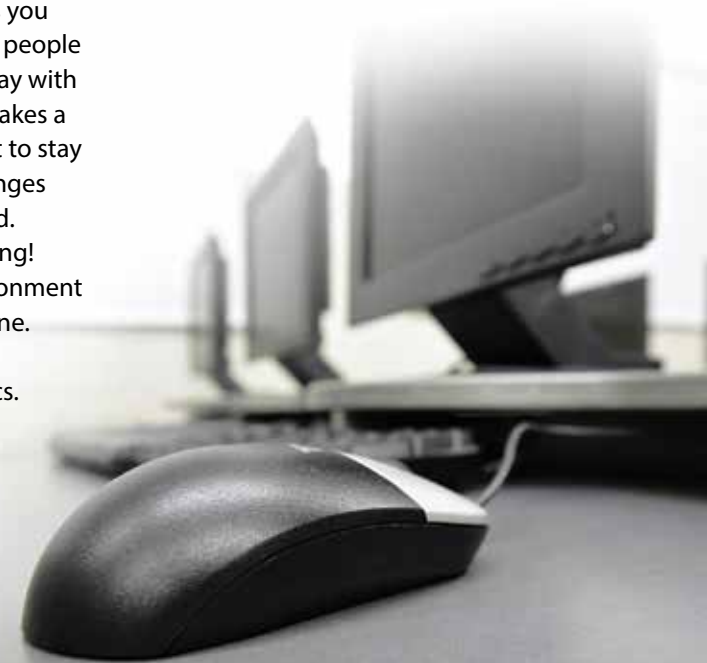
The work I do enables more complex modeling and higher fidelity simulations in studying all sorts of physical phenomena. The scientists and engineers we work with are able to use this information to build next-generation products that are more efficient and safer to power our nation and developing countries.

### What advice do you have for future computer scientists?

My advice to students in this field is to get as much exposure to current and emerging technologies as you can. We are always looking for people who like to learn about and play with technologies on their own. It takes a lot of curiosity and excitement to stay current with the constant changes we see in the computing world. Learn and tinker with everything! Download a developer's environment and build an app for your phone. Take an online programming course. Get involved in robotics. Just get involved!

# \$67,000

AVERAGE STARTING  
SALARY





# Computer Software Developer

Computer software developers specialize in either computer software applications or computer software systems. They analyze users' needs and then design, test and develop software by applying the theories and principles of computer science and mathematical analysis.

This career would be a good fit for you if you:



Are detail-oriented



Have strong skills in math and science



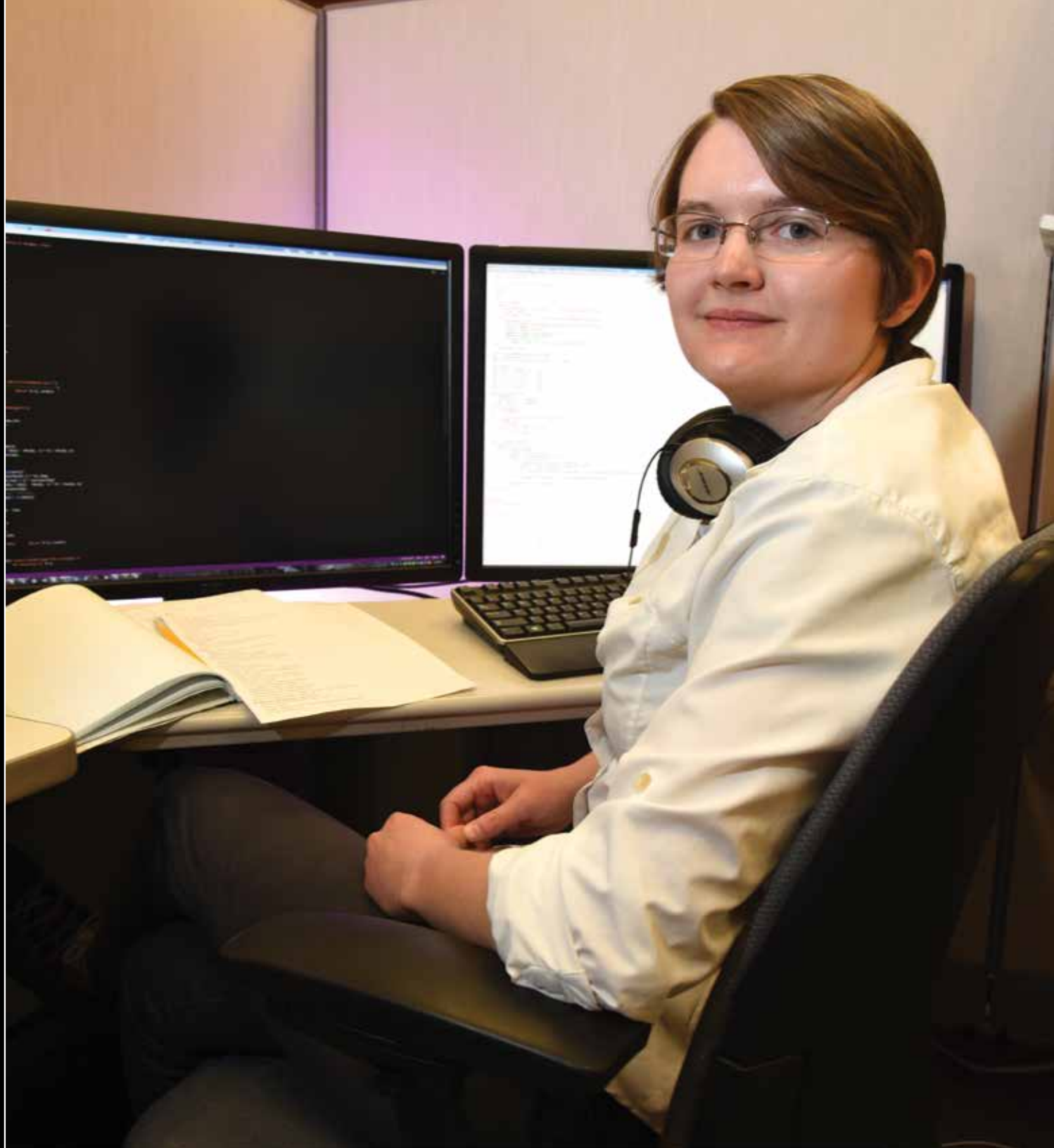
Like the challenge of learning new things



Have strong computer skills



Are good at problem-solving and troubleshooting





## Meet Shiloh Elliott, a computer software developer at INL

### Education background:

Master's degree in geographic information systems (GIS) from Idaho State University

Bachelor's degree in anthropology from Idaho State University

### Job description:

I work for the National & Homeland Security Division at INL. My daily tasks vary depending on which project I'm working on. A very simple way to define my job is that I write programs that allow INL to analyze geospatial data (data that represents actual structures on the planet).

### What led you to become a computer software developer?

While I had taken programming classes in high school, it was never on my radar as a potential career path until graduate school. Geographic information science is a data-heavy field. When I was shown how programming could greatly reduce the time it took to process this data while increasing the accuracy, I was hooked. As I took more programming classes, I realized not only did I enjoy the subject, but I was also good at it. The logical steps and critical thinking vital to programming made me want to pursue a career in computer science and informatics.

I have always been interested in maps and am an avid backpacker. This evolved into an acute interest in GPS and spatial relationships. In high school, I took computer programming sequence, which prepared me for my college programming classes. I also took several advanced placement and dual-enrollment college courses, which required critical thinking, problem solving, and time management skills, all of which are vital for computer scientists. As an outdoor enthusiast, I developed an intimate knowledge of how maps work and analyzing spatial relationships, which led me to pursue a graduate degree in geographic information science. It was exciting to find a way to merge my love of the outdoors with my love of computer science.

### What do you love about your job?

I love the problem solving my job requires. I get to develop applications that have never been done before and apply familiar algorithms in new, innovative ways. I like that my job is not stagnant; I learn new things every day and am able to apply the skills I developed in school in surprising ways. I also really like working with a team, where I can provide vital

support to the project and my colleagues while getting the same support from them.

### Why is your work important to the mission of INL and the world?

I develop new homeland security applications to help the government better understand our critical infrastructure systems, including electricity and water systems. Understanding where our energy comes from and how it reaches the general population is vital to the United States' energy security. These applications range from traditional maps to new innovative online mapping applications.

### What advice do you have for future computer software developers?

I encourage high school students who think that they are interested in computer science to simply take a class. If your high school does not offer such classes, there are great online resources. Give yourself plenty of time and do not get discouraged if you do not get it right away; determination and hard work are the keys to computer programming.

# \$67,000

AVERAGE STARTING  
SALARY



# Electrical Engineer

An electrical engineer is someone who designs and develops new electrical equipment, solves problems and tests equipment. They work with all kinds of electronic devices, from the smallest pocket devices to large supercomputers.

Electrical engineering deals with electricity, electromagnetism and electronics. It also covers power, control systems, telecommunications and signal processing. These engineers are usually concerned with large-scale electrical systems such as motor control and power transmission, as well as using electricity to transmit energy.

This career would be a good fit for you if you:



Are naturally curious about how things work



Enjoy both math and science



Like to tinker with electronics



Have good problem-solving skills



Are curious about how systems work





## Meet Phillip Ozmun, an electrical engineer at INL

### Education background:

Master's degree in electrical engineering from Auburn University

Bachelor's degree in mechanical engineering from University of Idaho

### Job description:

I design electrical systems for new projects and facilities at INL. This includes power systems design and modeling, creating construction drawings and specifications, producing technical evaluations and concepts for new projects and modifications, and working with customers and shareholders to ensure project and facility requirements are met.

### What led you to become an electrical engineer?

I was always interested in math and science in junior high and high school—and took all of those classes (trigonometry, geometry, algebra, calculus, physics, chemistry and other natural sciences). I was the kind of kid who liked to take things apart to see how they worked. It still amazes me how well math and science describe and explain the natural world.

### What do you love about your job?

I really enjoy the work and the variety. It seems like every project is somewhat different, so I get to learn new things quite often. Due to the different sites across INL, it's nice to see how different groups get work done and try to share lessons across a variety of groups.

### Why is your work important to INL's mission and the world?

I am part of the engineering services group that supports infrastructure and facility upgrades at INL. We support research and other lab groups by designing systems for new and existing facilities.

### What advice do you have for future electrical engineers?

Develop a passion for learning. There are so many things to learn and understand in the world and so many tools available to help today's students. Take as many math and science courses as you can, and if something sparks your interest, use the internet or other tools to learn more about your particular interests.

I'd also stress the importance of learning to work in teams. Working with others to coordinate and share ideas, schedules and decisions will improve the outcome of a project because you're able to draw upon each other's unique strengths and talents.

# \$71,000

AVERAGE STARTING  
SALARY

"I was the kind of kid who liked to take things apart to see how they worked."



## Materials Science

A materials scientist is someone who studies and analyzes the chemical properties and structure of different man-made and natural materials. Glass, rubber, ceramic, alloys, polymers and metals are all studied and investigated to learn or gain new knowledge. They then take this knowledge and devise ways to strengthen existing materials, combine particular materials or create brand new materials with certain properties and characteristics for use in different applications and products.

This career would be a good fit for you if you:



Are strong in chemistry, physics and math



Enjoy designing and executing experiments



Enjoy researching and analyzing data



Are a good problem solver





## Meet Joshua Kane, a materials scientist at INL

### Education background:

Master's and doctoral degrees in materials science and engineering from Boise State University

Bachelor's degree in chemical engineering from the University of Idaho

### Job description:

Most of my research focuses on materials that will be used in the next generation of nuclear reactors. I get to work closely with a number of different disciplines including nuclear engineers, chemical engineers, mechanical engineers, chemists and physicists. Often, my work focuses on figuring out how a material will behave in extreme environments or trying to make it work better.

### What led you to become a materials research scientist?

Growing up, I was always fascinated with how things work. I was always getting in trouble for taking things apart to see how they worked or to make them do things they weren't made for. I would have never admitted it back then, but I really enjoyed math and science and took as many of those classes as I could (physics, chemistry, calculus, trigonometry). Drafting, wood shop and metal shop were also great for

hands-on experience and learning how to build things.

My father was an engineer and convinced me I'd like engineering. Four years after finishing my chemical engineering degree, I graduated with a Ph.D. in materials science and engineering.

### What do you love about your job?

There are three things I enjoy most about my job:

- 1) I get to work with people from all over the world with different backgrounds and skill sets.
- 2) Work is never boring. Every day it's something new.
- 3) Quite often I'm working on something that no one has ever done before, which is kind of an exciting thought.

### Why is your work important to INL's mission and the world?

INL's primary mission is related to innovative nuclear energy solutions. My work plays a small part in advancing next-generation nuclear reactor technology including the small modular high-temperature reactor. Making nuclear energy more viable and economical could enable development of hybrid systems that

integrate nuclear with other forms of energy such as wind. Advancing nuclear energy in the U.S. will help secure our critical energy infrastructure and make it more resilient.

### What advice do you have for future materials scientists?

Start exploring the field. Try to talk with people in the field. See if you can get a summer job working with a scientist or engineer to get some perspective about what we do. It is important to do well in math and science classes now. Don't just memorize the material for tests then forget about it. Try to truly understand the concepts. It will help you out later on, and you will never regret it.

# \$70,000

AVERAGE STARTING  
SALARY

## Mechanical Engineer

As the broadest field of engineering, mechanical engineering plays an important role in nearly every industry, from aerospace and automotive, to energy and manufacturing, to robotics and biotechnology. Mechanical engineering is the discipline that applies the principles of engineering, physics and materials science for the design, analysis, manufacturing and maintenance of mechanical systems.

This career would be a good fit for you if you:



Are naturally curious about how things work



Enjoy math and science



Like to tinker and build things



Are a creative problem solver



Want broad career opportunities





## Meet Jordan Hill, a mechanical engineer at INL

### Education background:

Bachelor's degree in mechanical engineering from Boise State University

### Job description:

I work on the Core Internals Changeout (CIC) team at INL's Advanced Test Reactor (ATR). Components of the reactor are replaced, as necessary, approximately every 10 years to prevent excessive fatigue due to radiation exposure and to ensure experimenters can correctly model the reactor for testing. My day-to-day tasks include tooling design, procurement of ATR core components, and verifying that the CIC process incorporates code/requirement changes since the previous CIC.

### What led you to become a mechanical engineer?

In high school I was involved in athletics, the arts and volunteer work. My junior year of high school, I was convinced I was going to become an artist. I wanted to create. While researching careers that would allow me to do just that, I came across engineering—specifically mechanical engineering. At first glance, one would probably have a hard time connecting these interests to an engineering career. However, the

challenge of playing on a sports team taught me how to work with others and take on leadership roles, art helped me become more innovative and creative, and the challenge of some volunteer projects developed my troubleshooting abilities.

### What do you love about your job?

I love my job because of the uniqueness of our business. Unlike the typical nuclear reactor, the ATR is not designed to generate electricity. Instead, it is a test reactor designed to generate high concentrations of energy in the form of neutrons and deliver them to specific test locations within the reactor. These tests can then be used for research to help with the evolution and advancement of the nuclear and medical fields.

### Why is your work important to the mission of INL and the world?

It is no secret that energy is the lifeblood of this country. Energy holds the key to the environment, the economy and national security. My career in the nuclear field is more than just a paycheck; it is me doing my part to continue the successful operation of the ATR, to progress nuclear technology research and development.

### What advice do you have for future mechanical engineers?

Gain as much experience as you can. Tour facilities and ask questions, take a welding class, attend a career shadow day or company open house, attend career fairs, find a mentor in your interested field, attend an engineering summer camp, etc. These activities will give you the opportunity to “try out” your future career before you even get to college. Follow the college preparatory curriculum in your high school, while taking as much math and science as possible (up to and including advanced placement courses). However, engineers must also communicate their design ideas and decisions, so writing and communication classes are also an important part of the studies of a successful aspiring engineer.

# \$71,000

AVERAGE STARTING  
SALARY



## Nuclear Engineer

A nuclear engineer applies the principles of nuclear physics to design, construct and operate systems such as nuclear power plants that involve radiation and nuclear reactions.

This career would be a good fit for you if you:



Have a strong foundation in math, science and physics



Are interested in energy and alternative energy



Are a creative problem solver



Want to lead research in the field





## Meet Aaron Craft, a nuclear engineer at INL

### Education background:

Ph.D. in nuclear science and engineering from Colorado School of Mines

Master's and bachelor's degrees in nuclear engineering from Missouri S&T

### Job description:

As a nuclear engineer at INL, I work on many exciting projects to develop advanced nuclear fuels and the instruments that examine how these fuels perform in a nuclear reactor. One main project I lead is to develop advanced neutron radiography capabilities for evaluating nuclear fuel, which is similar to X-ray radiography at a doctor's office but uses neutrons instead of X-rays.

### What led you to become a nuclear engineer?

In high school, I enjoyed science and engineering, and I always wanted to know how things work. Some classes that led me to choose an engineering degree include engineering and drawing, chemistry and physics classes. I enjoyed these classes, and they inspired me to pursue engineering in college. The math was difficult at times, but I worked through it and succeeded.

Nuclear engineering is a challenging but prestigious field. The systems that nuclear engineers work on are complex and very interesting. Our world faces significant energy challenges in the future, and nuclear power is the answer to the long-term power needs of advanced societies. Nuclear power is carbon-free. Also, advanced nuclear power plant designs are safe, really safe. Combining new reactor designs and an advanced fuel cycle could supply the world's power needs for thousands of years to come. I found, and still find, the promises of nuclear power to be worth pursuing, and I am still glad I made that decision.

### What do you love about your job?

I get to work on really cool things that have a real and positive impact on society. I love all things nuclear, and this is where nuclear energy happens. I also appreciate history, and INL was the place where the very first nuclear power plant was built, and was also the location where over 50 other reactors were built. This is the place to be for someone like me who loves nuclear power and wants to work to see it succeed. Solving big problems is what INL does, and it is rewarding to be part of a team working on important projects.

### Why is your work important to the mission of INL and the world?

The projects I work on help make better nuclear fuels for safer and more efficient nuclear power plants. Additionally, my work contributes to a smarter fuel cycle, from mining to disposing of nuclear waste. These important projects at INL will lead to a safer world and more environmentally friendly energy source for generations to come.

### What advice do you have for future nuclear engineers?

If you want to be a nuclear engineer, it's important to do well in your classes now. Invest the effort; you're worth it. Also, get involved in design teams if they are available. Team sports will also help develop teamwork skills that are necessary for engineers. Math and science seem to be the common advice, and those things are important. More important, however, is developing a genuine interest in them. Start asking yourself, "How does this work?" Think creatively. There are many types of engineers, and they all take the same basic courses in college before choosing what kind of engineering they want to specialize in. All engineering fields require someone who is intelligent, but the best engineers are creative too.

# \$71,000

AVERAGE STARTING  
SALARY

## Physicist

A physicist is someone who explores and identifies the basic principles that govern the structure and behavior of matter, the interaction between energy and matter, and the generation and transfer of energy.

This career would be a good fit for you if you:



Consider yourself a pragmatic person



Are a creative problem solver



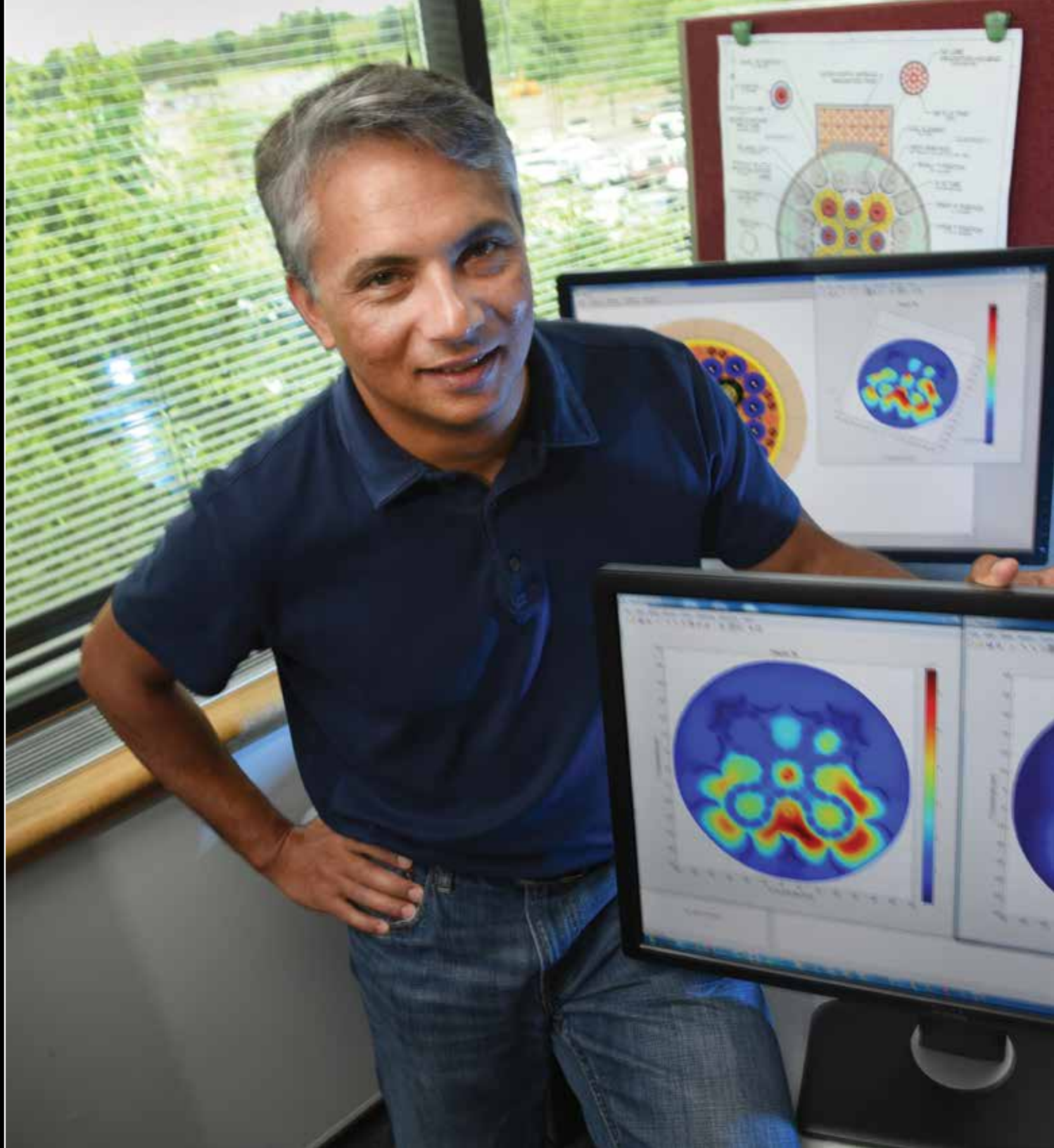
Have strong skills in math and chemistry



Use scientific rules and methods to solve problems



Enjoy researching and analyzing data





## Meet Zain Karriem, a senior reactor physicist at INL

### Education background:

Ph.D. in nuclear engineering from Pennsylvania State University

Master's degree in physics from University of the Western Cape, South Africa

### Job description:

My focus area is reactor physics and particle transport modeling (i.e., how neutrons and gamma rays move inside a nuclear reactor), and how their interactions affect the reactor's physical parameters (e.g., reactor power). Projects that I am working on relate to the Advanced Test Reactor (ATR) and high-temperature reactors.

### What led you to become a physicist?

My initial interest in science started with chemistry—coming to learn about various natural (and rather violent) chemical reactions. I was interested in how we are able to understand the processes involved and use this knowledge to predict the outcomes of other chemical reactions. This later led to a greater interest in how the physical world works (physics) and especially at the subatomic scale, which ultimately led to my career choice in reactor physics. High school classes I took were chemistry, physics and mathematics.

### What do you love about your job:

My work in reactor physics entails the calculation of physical things (neutrons and gamma rays) that we can't even see, which will always be pretty amazing to me! What I like about being a reactor physicist is that it brings together many disciplines—like physics, chemistry, mechanical engineering, material sciences, etc. The work I perform is an input to all these areas, which gives me a sense that my work is important, but it also offers me the opportunity to learn about other science and engineering disciplines.

### Why is your work important to INL's mission and the world?

INL is home to the ATR, which is a versatile reactor that is used for material testing and for the production of medical radiation sources. The primary customer of the ATR is the Office of Naval Reactors, who has the comprehensive responsibility for the safe and reliable operation of the U.S. Nuclear Propulsion Program. My work supports the safe, future operations of the ATR.

### What advice do you have for future physicists?

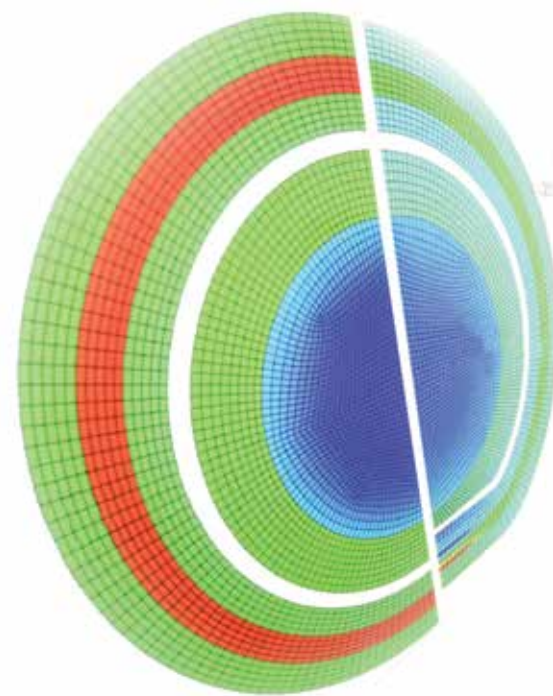
You'll have to take physics and math classes as preparation. However, try to focus on the physical phenomena, as this is ultimately what physics and mathematics aim to describe. There are many educational resources out there (YouTube) that explain and illustrate various scientific and mathematical concepts. Find this information.

Explore your curiosities and interests. This curiosity provides the energy and effort you need to expend to learn new things and achieve your goals, but it will be fun.

Never give up!

# \$68,000

AVERAGE STARTING  
SALARY



## Power Engineer

Power engineers are in charge of making sure that electrical operations are running effectively and efficiently. They ensure electricity is properly generated and delivered in a steady, safe manner. Power engineering, also called power systems engineering, is a subfield of energy engineering and electrical engineering that deals with the generation, transmission, distribution and utilization of electric power and the electrical devices connected to such systems including generators, grid systems, motors and transformers.

This career would be good for you if you:



Are interested in energy



Enjoy both math and science



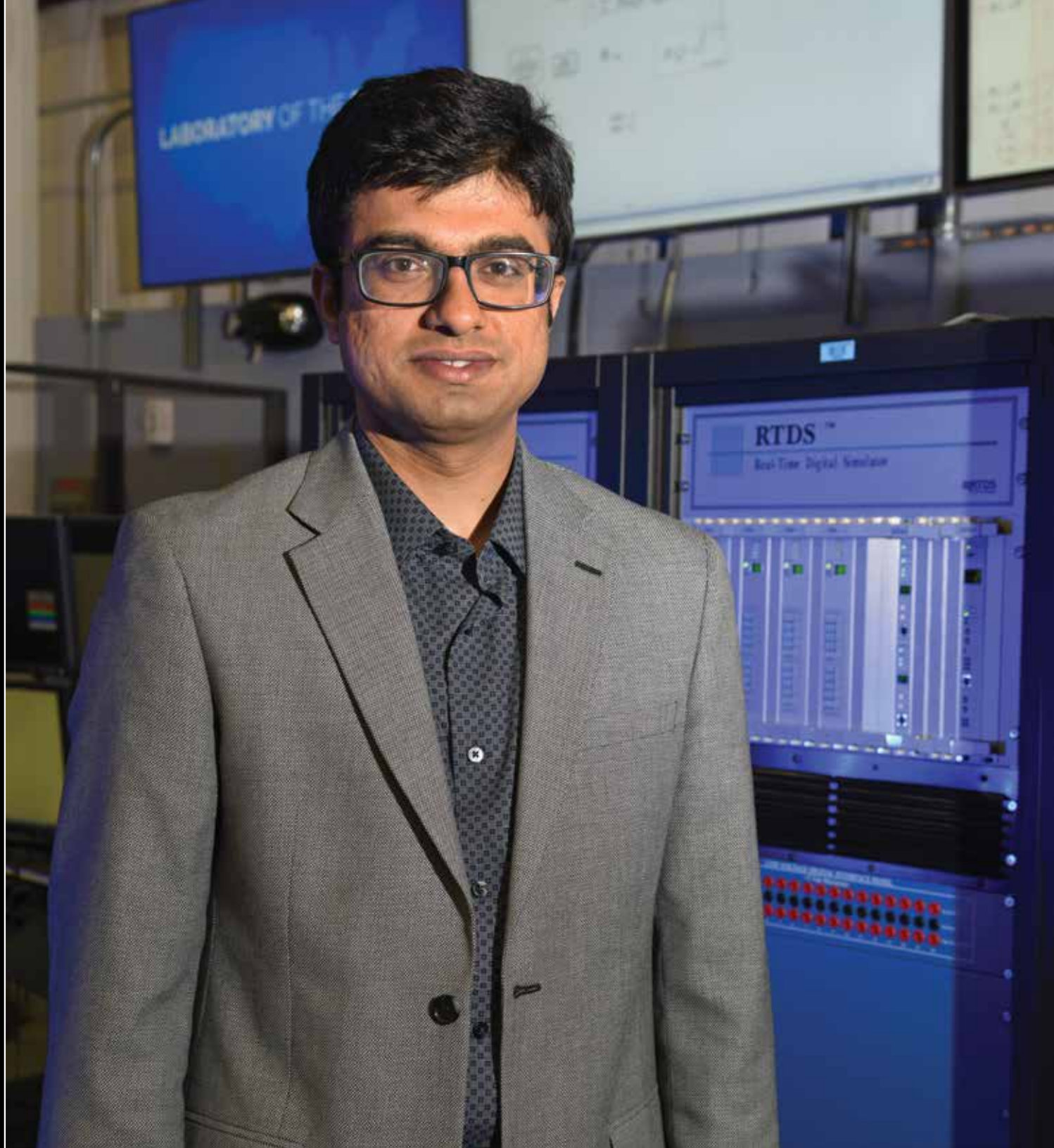
Like to solve problems and develop solutions



Like to fix things



Are curious about how systems work





## Meet Manish Mohanpurkar, a power and energy systems scientist at INL

### Education background:

Ph.D. in electrical engineering from Colorado State University

### Job description:

Power and energy systems science is one of the major fields within electrical engineering. My job involves research and innovation of different aspects of the electric grid to make electricity greener and more reliable. I create algorithms and design control technologies in real-time environments to verify new ideas related to wind energy, solar energy, electric vehicles, hydropower, microgrids and battery systems.

### What led you to become a power engineer?

The first time I visited my father's transformer manufacturing company, I was thrilled to see high-voltage electricity operations. Electrical engineering fascinated me because electricity is an "invisible" form of energy that flows through metallic conductors and has observable impacts. School visits to a hydropower generation facility and similar industries enhanced my interest. I also helped my father fix home wiring and troubleshoot problems with home appliances. In high school I had great physics,

chemistry and mathematics teachers, building a foundation for a strong technical career.

### What do you love about your job?

I love my job because not one day is similar to another. On a daily basis, I deal with different technical aspects of power and energy systems. This keeps my interest strong in this area and allows me to innovate. Plus, I consult with world-class researchers and work in facilities where cutting-edge research is performed.

### Why is your work important to INL's mission and the world?

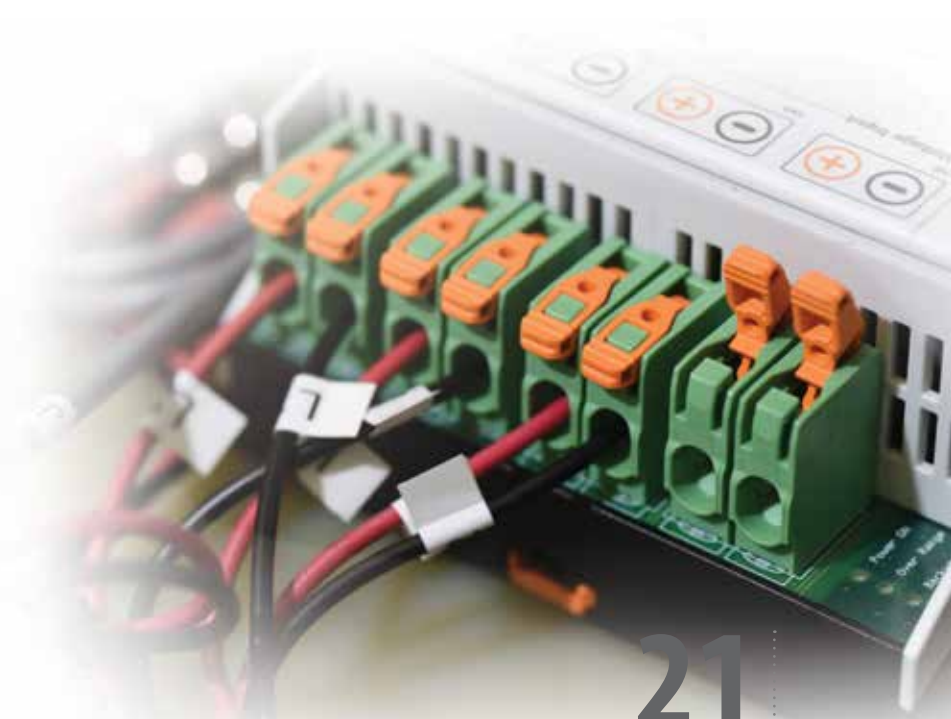
My work directly contributes to INL's mission of creating the next generation of energy solutions that will be clean, resilient and reliable. Our research with microgrids and real-time simulations is helping develop a microgrid solution at a Northern California Red Cross emergency shelter site. Another project will develop smarter reconfiguration and a resilient power grid for the city of Idaho Falls. These efforts help our community, the region, our nation and the world build better energy infrastructure.

### What advice do you have for future power engineers?

Maintain a learning attitude. Attempt to chase diverse goals and learn from your academic and life experiences. Learn how science and math apply to the real world—not only with books but with nature. Take lessons beyond the books to learn physics concepts by performing simple experiments. This will inspire ideas and innovation. Grow, be a scientist, and remember that it is cool to call yourself a "scientist!"

# \$67,000

AVERAGE STARTING  
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## Research Scientist

Research scientists carry out experiments and investigations to broaden scientific knowledge. You could work in industry research and development, for a university research department, in government labs or for defense companies.

This career would be a good fit for you if you:



Have an inquiring mind



Enjoy math and science



Plan and carry out experiments



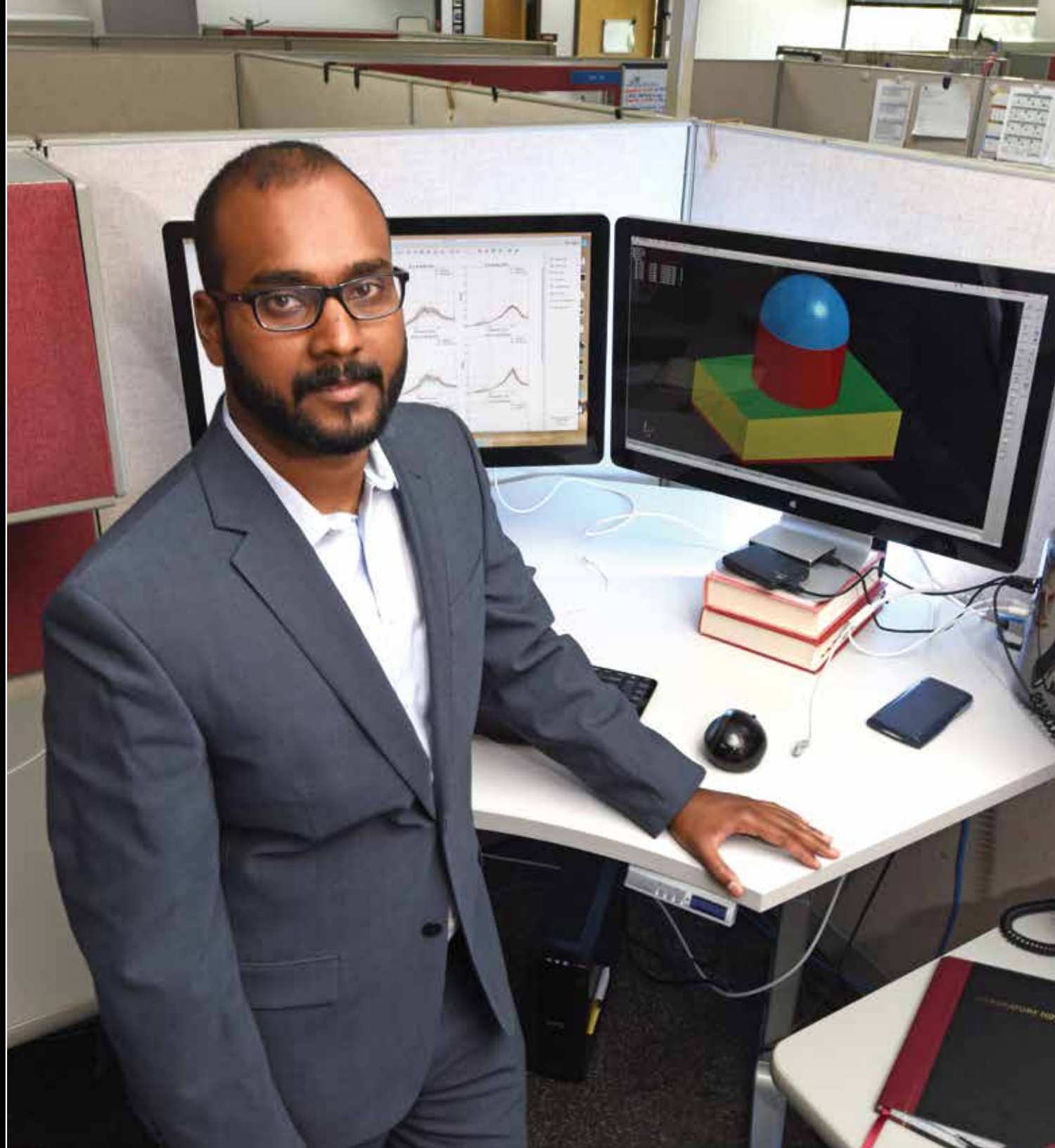
Enjoy collecting and analyzing results and data



Have patience to carry on when you don't get expected results



Are a good problem solver





## Meet Chandu Bolisetti, a research scientist at INL

### Education background:

Master's and doctoral degrees in civil engineering from University at Buffalo, SUNY

Bachelor of technology in civil engineering from Indian Institute of Technology, Bombay, India

### Job description:

I am a research scientist working with the Seismic Research Group. I do earthquake engineering research, which involves improving mathematical models that predict earthquake forces, modernizing methods that are used to calculate earthquake risk and also performing various earthquake-related experiments.

### What led you to become a research scientist?

As a kid I was fascinated by gigantic structures like bridges and dams. I also enjoyed math, physics and writing computer programs. These interests led me to pursue an undergraduate degree in civil engineering with an emphasis on structures. After college, I found myself interested in research and asking myself the question: "Which field in civil engineering can help people the most?" Growing up in India, which has historically seen

devastating earthquakes, earthquake engineering was quite an easy choice. So I went ahead, pursued a master's and Ph.D. in structural and earthquake engineering, and here I am applying my knowledge to nuclear structures.

### What do you love about your job?

I like to think, learn and solve problems. My job requires a lot of critical thinking, solving interesting problems and learning new things. I love the flexibility of working on different projects based on my interest, and the fact that I can come up with new ideas for research and pursue these ideas.

### Why is your work important to INL's mission and the world?

The main objective of my research is to make nuclear structures less expensive and safer at the same time. Less expensive nuclear power plants will lead to the production of more nuclear energy and introduce more competition in the nuclear market. Given that nuclear energy is a vital clean energy resource, I believe our work will be helpful in meeting the deadlines of global warming.

### What advice do you have for future research scientists?

I believe that curiosity, hard work and taking care of yourself are a powerful combination for being a good scientist. Never stop learning and always look for ways to improve yourself and go forward. Curiosity is essential in science. Stay curious and keep up with the latest advances in the technologies that you like. Use resources like magazines and websites, and make reading a habit.

# \$72,000

AVERAGE STARTING  
SALARY

"My job requires a lot of critical thinking, solving interesting problems and learning new things."

## Health Physics Technician

A health physics technician/radiological control technician provides recommendations to ensure the radiological safety for workers at nuclear facilities. They are responsible for monitoring radiologically controlled areas on a regular basis using fixed and portable survey instruments to evaluate radiation, contamination and airborne radioactivity levels to confirm proper controls are implemented. Additionally, they conduct sampling and analysis of various media to quantify radiation levels. They use, calibrate and service radiation detection instruments to ensure proper operation.

This career would be a good fit for you if you:



Enjoy challenging work



Can work in a variety of environmental conditions



Can work in occasional high-pressure situations



Have strong math and science skills





## Meet Briana Phillips, a health physics technician at INL

### Education background:

Certification of Applied Science in radiation safety technologies from Eastern Idaho Technical College (EITC)

### Job description:

As health physics technicians, a specialized branch of safety, we maintain radiological levels within established boundaries to ensure the people, the environment and our work equipment stay safe. That being said, something someone at my very first job said has always stuck with me about what our description should really read. They said, “Health physics technician: one part cartographer, one part watchful big sister/brother and one part fun!” While our first priority at work is focused on safety, we are still able to have fun and enjoy what we do.

### What led you to become a health physics technician?

For me, it was a unique, up-and-coming field that I wanted to know more about. A lot of people are completely misinformed about nuclear power, they get this image of an atomic bomb and a sense of fear every time they hear the word, and that just isn’t right. Atoms and molecules make up everything! I

don’t know who came up with the “science is uncool” stereotype, but it’s just not accurate. I remember my chemistry teacher in high school; he started out each day with a demonstration. He did everything: lighting things on fire, adding sulfuric acid and sugar together, or adding iodine, zinc and water to make purple smoke (an exothermic reaction), now THAT is cool. Go ahead, look it up. It’s awesome!

### What do you love about your job?

The people. Pretty much every other health physics technician I’ve heard asked that question answers the same. There is such a unique camaraderie among the people you work with. It creates such a lively, light environment, and then in an instant, it’s game time, and everyone gets their game faces on to work. Everyone looks out for one another because at the end of the day, we all want to go home to our families the way we came in.

### Why is your work important to the mission of INL and the world?

Like any great organization, it really does funnel down to the day-to-day individual succeeding at their role. Radiological research and development has to be monitored

and maintained. There are some totally rare and unique radiological isotopes here at INL that need special attention. We are one of the many safety checks that go along with the responsibility of working with such powerful substances. I know you are all quoting the Spiderman in your head now. . .

### What advice do you have for future health physics technicians?

Develop a strong basis at school and have a positive attitude. I know everyone says that, but it’s true! I always wish I had paid more attention in class. There will be moments after school—and trust me they’ll come—where you’ll say, “oh I remember learning about that,” but you can’t remember how to do it to save your life! You really want to build on what you learn in high school, instead of having to relearn it all. Be confident in your skill set, hard work does pay off.

# \$42,000

AVERAGE STARTING  
SALARY



## Nuclear Technician

Nuclear technicians assist physicists, engineers and other professionals in nuclear research and nuclear production. Nuclear operations technicians work in a structured environment and operate specialized equipment. They must be able to take direction, follow protocol and have a commitment to safety. Job responsibilities can include monitoring and maintaining test instruments, gauges and recording devices in control rooms during equipment operation. Technicians calculate equipment operating factors, such as radiation times, dosages, temperatures, gamma intensities and pressures, using standard formulas and conversion tables.

This career would be good for you if you:



Like working with your hands



Are willing to work some weekends and holidays or rotating shifts



Like figuring out how mechanical things work



Work well under pressure





## Meet Brian Kajganich, a nuclear facility operator/nuclear technician at INL

### **Education background:**

Bachelor's degree in business administration: management and operations from Idaho State University

Bachelor's degree in biological sciences from Idaho State University

### **Job description:**

As a nuclear facility operator at INL's Hot Fuel Examination Facility (HFEF), I routinely perform remote-handling operations of special nuclear and irradiated materials from within a shielded hot-cell environment. I operate equipment and systems responsible for assisting with research that further develops nuclear fuel and material technologies. This includes the preparation and examination of irradiated experiments in support of numerous programs.

### **What led you to become a nuclear facility operator/nuclear technician?**

The hobbies and interests that led me to my career include: metal welding/fabrication, machine work, working on cars and motorcycles, building and creating things. I enjoy anything that requires me to use my mind and my hands to figure things out. I am a do-it-yourself kind of guy

and am always fiddling around with the latest project in my shop. Some of the high school classes that helped prepare me for my career included all mathematical classes (geometry, trigonometry, algebra); all science-based classes (chemistry, physics); welding; small engine repair; and wood shop.

### **What do you love about your job?**

As a nuclear operator, I am responsible for handling multimillion dollar projects and equipment. This in itself is remarkable! We use specialized remote-handling equipment that drives innovative research in the nuclear field aimed at domestic and worldwide use. Every time we touch a robotic manipulator, crane, cask or any piece of in-cell equipment, it is a new experience. No two jobs are alike. We are trained to appreciate and have a healthy respect for everything we handle inside and outside of the hot cells.

### **Why is your work important to the mission of INL and the world?**

Research and testing performed in our facility allows us to develop technologies that support the advancement of exotic nuclear fuels and materials that power new generation reactors all over

the world. This includes reactors operated not only in federal laboratories, but also reactors in the commercial and academic realm.

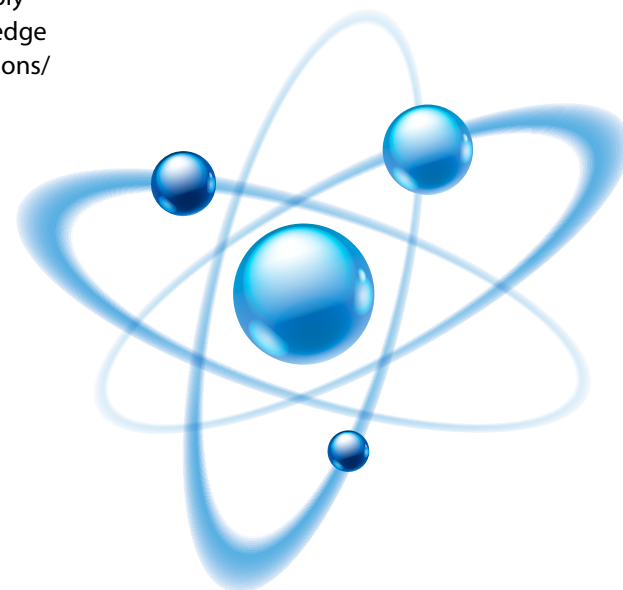
As a front-line operator, we work in concert with many groups to accomplish this mission on a daily basis. Without technicians there to operate, troubleshoot or even repair in-cell equipment for the programs, advancements would falter.

### **What advice do you have for future nuclear facility operators/nuclear technicians?**

My advice is to engross yourself in core curriculum surrounding science, technology, engineering and mathematics. This will supply you with a basic level of knowledge necessary to perform the functions/duties of a nuclear operator. There are a variety of classes and programs out there geared toward preparing students for becoming nuclear technicians. Specifically, colleges and specialty trade schools offer programs dedicated to these specialized areas.

# \$50,125

AVERAGE STARTING  
SALARY



## Research and Development Technician

A research and development (R&D) technician prepares and analyzes a variety of samples using standard technical procedures. They are responsible for operating and maintaining analytical chemistry instruments and preparing any waste for disposal. They must be able to take and follow specific instructions and complete work accurately using a variety of instruments and equipment, including pipettes, glove boxes, fume hoods and manipulators.

This career would be a good fit for you if you:



Are detail-oriented



Enjoy using instruments to gain understanding of samples



Work well in a busy environment that changes daily



Are a problem-solver



Work well under pressure



Have strong math and chemistry skills





## Meet Jana Crow, an R&D technician at INL

### Education background:

Certification of Applied Science in radiation safety from Eastern Idaho Technical College (EITC)

### Job description:

I perform analysis of irradiated and unirradiated fuels and samples for nuclear reactor research. I prep the dissolved material in the hot cells, using the manipulators. The samples are transferred to hoods for further dilutions and preparations. I then perform measurements and analysis on the samples by ICP-MS, an instrument capable of measuring trace components of a solution.

### What led you to become an R&D technician?

I enjoyed studying science and math in high school and knew I wanted a career in a technical field, but I was not sure exactly what career. I took many STEM-type classes—chemistry, biology, physics, algebra, geometry and trigonometry. I moved to Idaho after completing high school and became interested in working in the nuclear industry after learning about INL. I completed the Radiation Safety Program offered at EITC and was offered a job at Argonne National Laboratory as a health physics technician. I really enjoyed this job, but after 22 years I was

ready to learn something new. After working at the Analytical Laboratory, I became interested in the work that the chemistry employees were performing. When I learned of an opening for an R&D technician, I decided to apply for it. I was given the opportunity to change careers and learn about more aspects of the nuclear industry.

### What do you love about your job?

I enjoy the challenge of preparing the samples precisely. Each sample is different, and requires different preparations. I get great satisfaction when I have prepared the samples properly and the analysis comes up perfect. The scientists put a great deal of effort and research into producing the samples that I am asked to analyze. It is very rewarding to provide the scientists with precise and accurate measurements that will help them with their research.

### Why is your work important to the mission of INL and the world?

I perform analysis for new types of nuclear fuel and for the proper dispositions of older fuels. It is important to give accurate results to the scientists that are performing this research.

### What advice do you have for future R&D technicians?

Take math and science classes. If you are not planning on attending college, look into the programs offered at vocational schools. Check into programs that offer job-related training geared toward nuclear and chemical industries.

# \$41,000

AVERAGE STARTING  
SALARY

**“I get great satisfaction when I have prepared the samples properly and the analysis comes up perfect.”**

The Radiation Safety Program offered at EITC is an excellent program, and a good way to get into the nuclear industry. Then when you get a job, learn as much as you can from the experienced people you work with. They have a lot of knowledge, and they will gladly share it with someone who is interested. Work hard and be willing to help your co-workers, and you will gain a good reputation among your peers and supervisors.



**Employability  
skills are those  
skills which can  
be applied to  
most workplace  
situations...**





## Employability Skills

Employability skills are the “ready for work” skills vital to do the tasks required in your job. Employability skills are those skills which can be applied to most workplace situations and are general in nature. Simply stated: No matter what career you choose, everyone needs these skills.

### Employability skills include:

- **Critical thinking/problem solving:** Exercise sound reasoning and analytical thinking; use knowledge, facts and data to solve workplace problems; apply math and science concepts to problem solving.
- **Oral communications:** Articulate thoughts and ideas clearly and effectively; have public speaking skills. Learn to look people in the eye when speaking to them.
- **Written communications:** Write memos, letters and complex technical reports clearly and effectively.
- **Teamwork/collaboration:** Build collaborative relationships with colleagues and customers; be able to work with diverse teams, negotiate and manage conflicts.
- **Diversity:** Learn from and work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles and viewpoints.
- **Information technology application:** Select and use appropriate technology to accomplish a given task, apply computing skills to problem-solving.
- **Leadership:** Leverage the strengths of others to achieve common goals; use interpersonal skills to coach and develop others.
- **Creativity/innovation:** Demonstrate originality and inventiveness in work; communicate new ideas to others; integrate knowledge across different disciplines.
- **Lifelong learning/self-direction:** Be able to continuously acquire new knowledge and skills; monitor your own learning needs; be able to learn from your mistakes.
- **Professionalism/work ethic:** Demonstrate personal accountability, effective work habits.  
  
For example, punctuality, working productively with others, and time and workload management.
- **Ethics/social responsibility:** Demonstrate integrity and ethical behavior; act responsibly with the interests of the larger community in mind.
- **Respect:** Respect for your colleagues earns you respect in return and creates an atmosphere where collaboration, trust and teamwork are valued.

No matter  
what career  
you choose,  
everyone needs  
these skills

## RESUME

### Career Objective:

Management Consultant  
objective advice, expertise  
maximizing growth and

### Professional Experience:

- Over 10 years of
- Improved the
- Established
- Develop
- and rela
-

## About INL

Idaho National Laboratory is part of the Department of Energy's complex of 17 national laboratories. INL is the nation's lead laboratory for nuclear energy research, development, demonstration and deployment and we are engaged in the mission of ensuring the nation's energy security with safe, competitive and sustainable energy systems and unique national and homeland security capabilities.

In operation since 1949, INL is the site where 52 pioneering nuclear reactors were designed and constructed, including the first reactor to generate usable amounts of electricity. It was here that nuclear-generated electricity first powered an American community. Throughout our laboratory's history, scores of this country's best and brightest have come to advance the promise of nuclear energy.



[www.inl.gov/k-12-stem](http://www.inl.gov/k-12-stem)

*\*Salaries listed in this brochure are average starting salaries. Salaries are dependent on many different elements like education level, experience, position requirements, specialty within a degree, etc.*

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